

Niobophyllite

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Crystal Data: Triclinic. *Point Group:* 1 or $\bar{1}$. In polycrystalline aggregates of small flakes.
Twinning: By reflection on (001), common.

Physical Properties: *Cleavage:* Perfect on {001}, poor on {0kl}. Hardness = n.d.
 D(meas.) = 3.42 D(calc.) = 3.406

Optical Properties: Translucent. *Color:* Chocolate-brown; in transmitted light, brownish yellow to red-orange.

Optical Class: Biaxial (-). *Pleochroism:* Strong; X = Y = brownish yellow; Z = red-orange.

Orientation: Y = a; X \wedge b = 13°; Z \perp {001}. $\alpha = 1.724$ $\beta = 1.760$ $\gamma = [1.772]$

2V(meas.) = 60°

Cell Data: *Space Group:* P1 or $P\bar{1}$. a = 5.391 b = 11.88 c = 11.66 $\alpha = 113.1^\circ$
 $\beta = 94.5^\circ$ $\gamma = 103.1^\circ$ Z = 1

X-ray Powder Pattern: Seal Lake, Canada.

3.506 (10b), 10.52 (9), 2.778 (8), 2.574 (7), 3.019 (6), 3.258 (5), 3.741 (4b)

Chemistry:

	(1)		(1)
SiO ₂	33.40	MgO	0.16
TiO ₂	2.94	CaO	0.72
Al ₂ O ₃	0.89	Na ₂ O	2.49
RE ₂ O ₃	1.50	K ₂ O	5.51
Nb ₂ O ₅	14.76	F	0.46
Ta ₂ O ₅	0.52	H ₂ O ⁺	3.64
FeO	23.74	H ₂ O ⁻	0.08
MnO	9.83	-O = F ₂	0.19
		Total	100.45

(1) Seal Lake, Canada; corresponds to (Na_{1.57}K_{1.08}Ca_{0.17}RE_{0.12}) $_{\Sigma=2.94}$ (Fe_{4.44}Mn_{1.86}Mg_{0.05}) $_{\Sigma=6.35}$
 (Nb_{1.49}Ti_{0.49}Ta_{0.03}) $_{\Sigma=2.01}$ (Si_{7.47}Al_{0.24}) $_{\Sigma=7.71}$ [O_{25.25}(OH)_{5.43}F_{0.32}] $_{\Sigma=31.00}$.

Mineral Group: Astrophyllite group.

Occurrence: As discontinuous seams and polycrystalline aggregates within a paragneiss intruded by an alkalic syenite (Seal Lake, Canada).

Association: Albite, arfvedsonite, "aegirine-augite," barylite, eudidymite, neptunite, manganoan pectolite, pyrochlore, joaquinite, sphalerite, galena (Seal Lake, Canada).

Distribution: From Seal Lake, Labrador, Newfoundland, Canada. In the Ilímaussaq intrusion, southern Greenland.

Name: For its *niobium* content and the Greek word *phyllite*, meaning *leaf*, in allusion to its micaceous habit.

Type Material: Royal Ontario Museum, Toronto, Canada, M26148.

References: (1) Nickel, E.H., J.F. Rowland, and D.J. Charette (1964) Niobophyllite—the niobium analogue of astrophyllite; a new mineral from Seal Lake, Labrador. *Can. Mineral.*, 8, 40–52. (2) (1965) *Amer. Mineral.*, 50, 263–264 (abs. ref. 1).